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IMITATION, MODELING, AND CROSS-CULTURAL TRAINING

OTTO ZINSER

JULY, 1966

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IMITATION, MODELING, AND CROSS-CULTURAL TRAINING

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FOREWORD

This report was prepared as part of the inservice research program of Task 171008, "Training for Culture-Contact and Interaction Skills in Counterinsurgency." This task is in support of Project 1710, "Human Factors in the Design of Training Systems." Mr. Melvin Snyder was the task scientist and Dr. Gordon Eckstrand was the project scientist. This report was prepared during the period from August 1965 to January 1966.

The author wishes to acknowledge the suggestions and assistance of many persons, especially Mr. Melvin Snyder, Dr. Gordon Eckstrand, Mr. Philip King and Lt H. Todd Eachus, who provided guidance and assisted in review of the manuscript. Section VI was written by Mr. King.

This technical report has been reviewed and is approved.

WALTER F. GREYER, PhD
Technical Director
Behavioral Sciences Laboratory
Aerospace Medical Research Laboratorie

ABSTRACT

A study of the literature on imitation and modeling was conducted to aid in development of a modeling training technique to accelerate the acquisition of cross-cultural interaction skills. The modeling procedure is designed to provide exemplary behavior to the trainee via videotape recording. The literature review includes a summary of theoretical positions that have been formulated, a survey of research in terms of the variables that have been investigated, and a review of modeling techniques that have found application. A discussion devoted to implications for developing a cross-cultural training technique is also presented. The advantages and disadvantages of various procedures for constructing an effective modeling technique are examined. The literature reviewed indicated that a modeling training technique has to date not been used to aid in the acquisition of cross-cultural interaction skills. The report concludes with the recommendation that the effectiveness of such a training technique be evaluated.

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SECTION I

INTRODUCTION

PURPOSE

Within recent years the United States Air Force has expended considerable effort providing counterinsurgency support to underdeveloped nations who have requested such military aid¹. The role of the American adviser in this effort is an important one; success frequently depends upon how effectively he can transmit the skills of counterinsurgency warfare across divergent cultural conditions. The establishment of an adequate sense of rapport with his counterparts by the American adviser has often bridged this divergence. Differences in attitudes, gestures, values, etc., are assumed to be the primary blocks to the creation of the necessary rapport.

Haines (ref 1) has reviewed the cross-cultural training techniques currently being used by various Government agencies. He reported that present training programs consist of intelligence briefings, lectures on customs and habits, language instruction, reading materials, and the like. It has been suggested that training of this nature is inadequate, as knowledge about acceptable forms of behavior does not necessarily assure proficiency in carrying out these behaviors, or more simply, as Haines stated, "...knowing what to do is not equivalent to doing what you know" (ref 1, p 3). One solution may be the development of training techniques that will allow the trainee to apply what he has learned. A trainee for example, must practice in learning how to fly an airplane, and there is reason for assuming that the principle of practice as a learning device would also apply to acquiring skills for interaction with persons of other cultures.

Initial efforts in developing training techniques incorporating the considerations above have centered on the phenomenon of self-confrontation. Self-confrontation provides an individual with a complete audio and visual record of his performance via sound motion picture film or videotape recording (ref 2).

In the two studies that have been conducted to date, subjects (Reserve Officer Training Corps) were required to play the role of an Air Force captain, commanding a Mobile Training Team (MTT) in a Country "X." He was to report to a senior officer of Country "X" Air Force, reprimand him for one aspect of his behavior, commend him for another

¹ Counterinsurgency support refers to training in the navigation and flying of aircraft, air-drop procedures, aircraft maintenance etc.

aspect, and report out. Fifty-seven distinct behaviors were required of the subject in this sequence.

In the first study, by Haines and Eachus (ref 3), they found that subjects who received self-confrontation training along with a verbal critique of their performance, improved dramatically in their performances on a second trial of the role-play. From this pilot experiment they concluded that self-confrontation appeared to be an effective training method for the rapid acquisition of complex interaction skills. A second study, by Eachus and King (ref 4), compared subjects trained through self-confrontation with a control group that received an equal amount of training by the traditional "manual reading" method. This experiment also investigated the effects of attitude of the subjects toward the foreign culture on acquisition of interaction skills, and the retention over time of skills trained by self-confrontation.

The results of the study showed subjects trained through self-confrontation to reach a higher level of performance of the required behaviors than the manual reading group. Subjects with positive attitudes toward the foreign culture improved in performance more than subjects having neutral or negative attitudes. Finally, subjects trained through self-confrontation did 94% as well after a two-week interlude as they did on the terminal acquisition trial of the original training session.

A technique somewhat similar to self-confrontation is imitation, in which a person views the performance of a model, rather than himself. It may be that seeing a videotape of a criterion performance by a model, in conjunction with role-playing exercises, is as effective in enhancing subsequent performance as is self-confrontation.

To gain an understanding of the utility of modeling procedures for cross-cultural training, experiments are being planned that will compare model imitation with self-confrontation. Necessary to the design and execution of these experiments is an understanding of the theoretical issues and practical problems involved in modeling and imitation. This report is a review of the psychological and educational literature on the above phenomena, and a discussion of the implications for research in cross-cultural training.

DEFINITION OF IMITATION

"Imitation" has most satisfactorily been defined as behavior emitted in response to a model which resembles that of the model. No satisfactory definition of imitation is available, however, to distinguish it from "identification." Both terms are so closely related that at times they have been used interchangeably.

Some writers have attempted to draw some distinctions between the two concepts. Bandura (ref 5) finds imitation to be most closely associated with experimental psychology and identification with personality theories. Winch (ref 6, pp 27-28) states, "Usage suggests that imitation has a more behavioral connotation, with emphasis on cognition, whereas identification (especially through its development in Freudian psychology) has a more psychodynamic connotation, with emphasis on emotion." Symonds (ref 7) reserves identification to refer to activity involving the entire personality and imitation for isolated skills or acts. Finally, Secord and Backman (ref 8, p 532) have defined identification "...as a process accounting for the choice of one model rather than another." The Secord-Backman definition suggests that imitation be defined to refer to the processes governing model-like behavior, after model-choice or identification has occurred.

Two forms of imitation based on the observation of a model have been widely recognized. In one, the learning of a new response by matching or copying the model's response usually occurs in the presence of the model; in the other the imitative response occurs in the absence of the model. In the first, the observer notes the actions of the model. Then, he finds that if he matches the behavior of the model, he is rewarded. For example, the child imitates words uttered by its parents because social approval is provided on each occasion. Miller and Dollard (ref 9) have termed behavior of this kind as "matched-dependent" behavior. In the second form of imitation the observer attends to the outcomes of the model's behavior rather than on the actions. He sees the model is rewarded or punished for emitting a particular type of response pattern. For instance, a child learns, after accompanying his older brother to the store, that the brother receives candy in exchange for money (ref 5). The observation of the brother being rewarded serves as the incentive the child needs to emit like behavior on another occasion.

PREVALENCE OF IMITATION

The operation of imitation as a mechanism of human activity is evident in every stage of human development. It is found initially in the parent-child relationship at home. For the child it becomes one of the most important vehicles of obtaining knowledge, the short-cut the child needs to an otherwise tedious process of learning through direct experience. In school imitative behavior continues; it appears in the classroom and on the athletic field as well. With the advent of adolescence and adulthood the imitative process becomes somewhat more sophisticated. A repertoire of skills in communication and knowledge of the significance of environmental cues afford somewhat less reliance on direct imitation of a model. However, in many situations original copying behavior continues to be elicited. It appears, for instance, in the case of on-the-job training.

Whether in industry or in the Armed Services, modeling the operations of a piece of equipment is the method frequently used to teach the skills that are required for satisfactory task performance. The notion remains in force that at times it is easier to be shown than to be told. It would appear, therefore, at least on an intuitive basis, that modeling offers some promise of being an effective training method for the acquisition of cross-cultural interaction skills.

The following review of the literature on imitation is divided into five sections: theories of imitation; research with children; research with adults; modeling as a training technique; and implications for cross-cultural training.

SECTION II

THEORIES OF IMITATION

EARLY THEORETICAL CONTRIBUTIONS

Imitation generated considerable theoretical interest among psychologists at the turn and early part of this century. Numerous articles were published on the topic. But, it was not until Miller and Dollard's book, Social Learning and Imitation (ref 9), was published that imitation received its most comprehensive treatment as an important variable of human behavior. The major theoretical trends up to 1941 are briefly summarized below².

The trend around the turn of the century was to explain psychological phenomena in terms of innate abilities. Consequently, the most popular explanation of imitative tendencies was that they were instinctual. Theorists such as Tarde, Woodworth, Bagehot, Ellwood, and C. L. Morgan adopted this viewpoint.

A second group of theorists rejected the innate theories, pointing out that they fail to account for the elicitation of the first imitative act. In their place neurological mechanisms, Pavlovian conditioning theory and the reflex-circle principle were postulated. J. M. Baldwin, E. B. Holt, F. H. Allport, and Gardner Murphy were strong supporters of this school of thought. E. B. Holt's reflex-circle theory is representative of this group. Holt traced the development of the reflex-circle by beginning at that point

² For a more detailed treatment see, N. E. Miller and T. Dollard. Social Learning and Imitation. New Haven: Yale University Press, 1941, pp 289-318.

of the infant's life when it first emits random noises. Sound stimulates the infant's ears which send a distinctive excitation along the auditory nerves to the central nervous system. The excitation arrives, however, only a second or two after the sound-producing excitation. Consequently, by a process of simultaneous association, this excitation tends to follow along the neural tracts of the previous sound-producing excitation, affecting a repetition of the sound. After a large number of trials, a reflex-circle is firmly established and iteration ensues. A second person may subsequently reinitiate the reflex by duplicating the iterative sound. Behavior emitted under this condition is called imitation.

A third group of psychologists claimed that imitative behavior is learned, a result of reward and punishment. Thorndike, Hobhouse, and Jersild were prominent contributors to the development of learning imitation theories. Miller and Dollard have made the most outstanding contribution, however. The inherent weakness of reflex-circle theories, according to Miller and Dollard, lies in the assumption that the connection between the vocal response and auditory stimulus is strengthened solely by their temporal contiguity. They acknowledge that a temporal relationship is one of the conditions required for a connection between a stimulus and response, but this is not the only requisite condition; reinforcement is necessary for the strengthening of the connection, and withdrawal of reinforcement is required for its extinction. They add, without the additional contingency of withdrawal of reinforcement, reflex-circle imitative behavior would be expected to continue indefinitely.

To Miller and Dollard the presentation and removal of reinforcement are the primary factors controlling the elicitation of imitative behavior. The major mechanism which they have considered to be operative in the imitation process is what they have termed "matched-dependent" behavior; a subject is rewarded for matching the correct responses of a model during and following a sequence of initial trial-and-error responses. The Miller-Dollard theory is generally viewed as an instrumental conditioning theory.

RECENT THEORETICAL CONTRIBUTIONS

Little theoretical discussion of imitation has appeared in the literature since the publication of Social Learning and Imitation by Miller and Dollard. As Bandura (ref 5) points out, very little or no reference is made to the topic of imitation in some of the recent texts on learning (Deese, 1952; Hilgard, 1956; Bugelski, 1956; Kimble, 1961, for example); consequently, the topic appears to warrant more attention. Several recent theoretical innovations have appeared, however.

Asch (ref 10), drawing on some of Köhler's work on insight, suggested that researchers investigate the role of cognitive processes. He pointed

out that in problem solving, for instance, imitation is facilitated if an intelligent grasp of what is being observed exists. Without understanding, imitation fails to occur or produces "an awkward or helpless result" (p 390).

F. D. Sheffield (ref 11) proposed a mediational theory which suggests that the cue properties of perceptual and symbolic responses have the capability of eliciting imitative behavior. The main feature of this theory is that it is able to explain imitation occurring some time after modeling. Sheffield's theory is evidently an outgrowth of his research interest in programmed learning and film demonstrations.

Mowrer's (ref 12) theory of imitation is based upon the principle of secondary reinforcement from classical learning theory. Stimuli associated with the reinforcing stimulus, themselves become rewarding. A child will continue to imitate a model's behavior on occasions where direct reinforcement is not provided, because stimuli associated with a history of reinforcements have acquired secondary reinforcing properties. Mowrer also recognized vicarious reinforcement as an important variable of imitation; an individual watching a model being reinforced, perhaps in anticipation of himself being reinforced, finds the experience rewarding. With the impetus present, the observer proceeds subsequently to imitate the model's contingent behavior.

Bandura (ref 22) criticized imitation theories based solely on the reinforcement of trial-and-error learning for failing to account for imitative learning occurring in the absence of reinforcement. Results from some of his studies concerned with the imitative learning of aggression point to the importance of social agents as determiners of imitative behavior; he has found that both real-life models and symbolic models (such as those transmitted by sound film or television) can alone serve as effective means of eliciting imitative behavior. These findings have led Bandura to suggest that primary emphasis be placed on contiguous sensory stimulation as a sufficient condition for the acquisition of most forms of imitative behavior. For Bandura such variables as reinforcement, model characteristics, mode of presentation, and set-inducing conditions in most cases enhance and channel the observing organism's responses and to some extent determine the level of imitation that occurs. They are, however, to be regarded only as facilitative rather than necessary conditions of imitative learning.

The theories advocated by Sears (ref 13), Whiting (ref 14), Stotland (ref 15), and Maccoby (ref 16) may best be termed identification theories. According to Sears, dependency on the model is the factor determining identification. A mother's activity, having been associated with the satisfaction of the child's physical needs, acquires secondary reinforcing properties. As a result, the child becomes dependent on her not only for primary sources of gratification, but also secondary ones. A tendency to adopt the actions of the mother develops subsequently, particularly in her

absence, because activity of this nature is self-reinforcing. Whiting reported that a child is motivated to identify with the parent because it is envious of the control the parent exercises over resources; the child would like to possess the same powers. He added that such motivation develops only under the condition when resources have been withdrawn. Stotland proposed that identification occurs because the observer assumes he has traits in common with the model. This perceptual-cognitive process tends to generalize over other traits and may be inaccurate as far as the individual's estimation of himself and the model is concerned. Finally, Maccoby reported that he felt social power is the critical factor which determines identification. An individual is chosen as a model because he has the power to provide or withhold reward.

SUMMARY

Innate theories of imitation are now generally considered to be unacceptable. Reflex-circle theories are an improvement, but possess the weakness of not being able to explain the cessation of imitative behavior. Instrumental conditioning or reinforcement theories have received widest acceptance as they are able to account for both the acquisition and extinction of imitative behavior. Imitation is learned when it is rewarded and extinguished when the reward is withdrawn. "Matched-dependent" behavior, according to Miller and Dollard, is the most prevalent form of imitation. Some recent theorists disagree, however, and are directing increasing attention to such concepts as vicarious and secondary reinforcement and to social factors. The role of cognitive processes has also been given some consideration. Other explanatory constructs such as status envy, dependency, model-observer similarity, and social power have been treated as factors governing model-choice or identification.

SECTION III

RESEARCH WITH CHILDREN

VARIABLES

The research on imitation with children has revolved about the study of a specific set of variables. They are reinforcement, secondary and vicarious reinforcement, generalization, incidental cues, model characteristics, and individual differences. Each of these variables will be discussed in turn below.

REINFORCEMENT

Miller and Dollard (ref 9) used first-grade children as subjects in

their "matched-dependent" paradigm to investigate the effect of reinforcement on performance. The purpose of the study was to test their theory that reinforcement would perpetuate imitative behavior. Twenty subjects were placed in an imitative group and another group of 20 subjects in a nonimitative group; additional subjects acted as leaders. Two boxes were made available to the subjects in a room. The leader was instructed to go to one particular box in which he found a piece of candy each time. Subjects in both groups observed a leader and then were given trials immediately after the leader's trial. Subjects in the imitative group found candy in a box only when they chose the same box the leader had chosen; subjects in the nonimitative group were rewarded only when they chose the box opposite to the one chosen by the leader. After a criterion of two successive correct choices had been reached, a test trial was given. Test trial results indicated that all subjects of the imitation group learned to imitate and all subjects in the nonimitative group learned not to imitate. Miller and Dollard concluded that the results are in accord with expectations from their reinforcement theory.

Social reinforcement has also been subject to manipulation in a number of studies. Baer and Sherman (ref 17) reported that imitative responses such as head nodding, mouthing, and strange verbalizations increased in young children after they had received social reinforcement from a puppet. Henker (ref 18) varied approval provided by adult male models. One group of subjects was introduced to rewarding models, a second to a neutral model, and a third to a critical model. The highest imitation rates appeared in the rewarded group, followed by the neutral and criticized groups respectively. Stein and Wright (ref 19) studied social reinforcement in 4-6 year-old children and in like manner found that imitation increased when social reinforcement was provided.

SECONDARY AND VICARIOUS REINFORCEMENT

Bandura and Huston (ref 20) designed a study to test Mowrer's secondary reinforcement theory. Prior to observation learning from a model, nursery school children were placed with their models in one of two situations. For one group of subjects the model acted "warm" and for the other "cold." The results confirmed Mowrer's theory, as the "warmly" treated subjects imitated to a greater extent on later discrimination learning trials.

Bandura, Ross, and Ross (ref 21) reported a study in which the social power, status envy, and secondary reinforcement theories of identification were tested. In one experimental setting, an adult acted as a controller of resources (play materials in the experimental room). Another adult was permitted to play with the materials while a child watched. In a second experimental setting, the child instead of the adult was allowed to play with

the materials. Following these sessions, adults exhibited divergent behavior in the presence of the child; a measure of imitative behavior emitted by each child was obtained. The social power theory of identification would predict that children under the first condition would identify with the adult who acted as the controller of resources. The status-envy theory, on the other hand, would predict that the adult who acted as the consumer would more often be imitated. From secondary reinforcement theory, one would expect that children under the second experimental setting would imitate the adult who allowed them to play with the toys. The results obtained supported the social power theory over the others; imitative behavior emitted under the social power condition was greater than in the secondary reinforcement condition and considerably greater than in the status-envy condition.

In another study, Bandura, Ross, and Ross (ref 25) obtained results which indicated that when models are seen being reinforced, observers are more likely to imitate the model. An explanation of the results is that the observer experiences the model's reinforcement vicariously. Three groups of nursery school children observed child models under the following conditions: for one group, an aggressive model was rewarded; for a second, an aggressive model was punished; for a third, a nonaggressive model was neither punished nor rewarded; finally, for a fourth group, the model was expressive but not aggressive. As predicted, the rewarded aggressive model was imitated to the greatest extent.

Bandura and Kupers (ref 23) conducted a follow-up study seeking to determine whether self-reinforcement could also be acquired imitatively. One group of children observed either peer or adult models who expressed disapproval and approval of their performance on a bowling task and adopted a high criterion for task performance before rewarding themselves with candy. A second group of children watched models performing under the same conditions, except that they adopted a low criterion. A control group did not observe a model. On a postexposure test, self-reinforcement behavior of the children closely matched that of their models. Also, adult models were generally more powerful in transmitting self-reinforcement responses than peer models.

In a recently reported study, Bandura (ref 24) sought to establish whether observing a model being reinforced influences learning or merely the performance of imitative behavior. Groups of children observed aggressive film-mediated models either being rewarded, punished, or neither rewarded nor punished. The results from the postexposure tests revealed that children under the model-punished condition performed significantly fewer matching responses than children under the other two conditions. After the administration of the postexposure tests, positive reinforcers were offered to all children on the condition that they imitate their models. Results following this treatment condition showed no group performance differences. Bandura concluded that positive incentives had wiped out what were performance

differences, revealing an equivalent amount of learning among children of all groups.

Bandura cited the results from this study in support of his position that reinforcement functions mainly to facilitate the performance of imitative behavior and not the learning of imitative behavior, as other theorists have previously suggested. He proposed the theory that contiguous association of sensory events accompanied by perceptual and symbolic responses, possessing cue properties capable of eliciting model-like behavior following a demonstration, in most cases, are the only conditions necessary for learning to occur. This theory is very much like the one F. D. Sheffield proposed (ref 11).

The results from a pair of studies in which imitative aggressive behavior was obtained in the absence of reinforcement and following modeling provide additional evidence for Bandura's position. In the study by Bandura, Ross, and Ross (ref 25) one experimental group of subjects observed aggressive adult models, and a second observed nonaggressive models; a third group was given no exposure to a model. All subjects were subsequently mildly frustrated and later tested for imitative behavior. Subjects who were exposed to aggressive models exhibited more aggressive behavior than those of the other groups. In a follow-up study, Bandura, Ross, and Ross (ref 26) investigated the effect of film-mediated aggression on imitation. Subjects in one group observed real-life aggressive models. Subjects in a second group observed the same models on film. In a third group, subjects viewed an aggressive cartoon character. Following mild frustration, subjects of all three of these groups displayed significantly more aggression than control subjects and those who viewed nonaggressive models. The three experimental groups, themselves, did not differ from each other, however.

GENERALIZATION

Generalization of imitation is another variable which has been the focus of some attention. Miller and Dollard (ref 9) also investigated this variable in their "matched-dependent" paradigm. Following training in the two-box-choice situation another set of subjects was confronted with four boxes on the first test trial. Results showed that under these conditions only 75% of the subjects who were trained to imitate chose the leader's box. None of the children who were trained not to imitate chose the leader's box. The authors concluded that imitation of a response in one situation will generalize to new but somewhat similar situations.

Hartup (ref 27) also conducted a study to test the generality of imitative behavior over situations. Imitative responses of preschool-aged subjects were obtained from a doll-play interview which consisted of two-choice problem and story completion situations. Some of the measures

obtained were the frequencies of like-sex and opposite sex doll-model imitation. The results showed that like-sex imitation moderately generalized across stories and that opposite-sex imitation did not generalize across stories.

Baer and Sherman (ref 17) found imitation to generalize over other behaviors. After the imitative responses of head nodding, mouthing and strange verbalizations were established in young children by social reinforcement from a puppet, a fourth imitative response (bar-pressing) was found to increase in strength when reinforcement followed the other imitative responses. Bar-pressing was never directly reinforced. The increase in bar-pressing was taken to indicate that imitation generalizes in the interaction sequence between puppet and child, to overt behaviors not directly reinforced.

INCIDENTAL CUES

Wilson (ref 28) reported some interesting results on cue utilization in imitative learning. An experimental group of preschool children was given eight "matched-dependent" pretraining trials on a two-choice discrimination problem consisting of two boxes. Each time their choice coincided with that of a model, they were rewarded with a piece of candy. The boxes presented were of identical shape and color until the subject had learned to imitate. Thereafter, for the remainder of the eight trials, one box was replaced with one which was of a different color and shape. Following pretraining, subjects were given test trials to the discriminantly different boxes in the absence of the model. A criterion of five successive correct choices was observed. A control group received trials to criterion under test conditions only. The results revealed that the experimental group required significantly fewer test trials to reach criterion. However, in terms of the total number of trials (pretraining trials included), the two groups were not significantly different. An additional and important finding was that the experimental group made significantly fewer errors than the control group. Wilson concluded that the imitation learning method was at least as efficient as the trial-and-error method. The results of Wilson's study lend support to Mowrer's secondary reinforcement theory. The incidental cues present in the imitation phase of the study probably served as secondary reinforcers during test conditions.

Using a modification of the "matched-dependent" paradigm, McDavid (ref 29) also explored the role of incidental cues upon the imitation learning process. Three groups of preschool children were trained to imitate an adult model in a three-choice color discrimination problem. For one group, a model responded to one color 100% of the time. For the second, a model responded to a single color 67% of the time. For a third, the model responded to a single color 33% of the time, or randomly to all three. The leader was rewarded (a marble token) for each of his responses in all three conditions, and the subject was rewarded only for imitating. Subjects in all groups improved as training progressed but differed significantly with respect to

to performance levels. Consistent (100%) color association produced the most imitation, random (33%) color association produced less, and partial (67%) association produced the least. McDavid concluded that cues affect learning by imitation and that the greater the ambiguity of cue association the more interference is likely to occur. In a subsequent study McDavid (ref 30) obtained similar results.

MODEL CHARACTERISTICS

Rosenblith (ref 31) studied the effect of the sex of the model on learning by imitation. The results obtained lead to the conclusion that male models in general were more effective. In the two studies conducted by Bandura, Ross, and Ross (ref 25, 26), involving imitative aggression, the effect of the sex of the model was also investigated. They reported that both male and female subjects imitated the physically aggressive, male model to a greater extent than the female model.

From a doll-play interview situation, Hartup (ref 32) found that children tended to imitate the like-sex parent more frequently than the opposite sex parent. Maccoby and Wilson (ref 33) conducted a study in which they manipulated the sex as well as the social class of the model. Seventh-grade children observed models presented on film. As Hartup found, like-sex imitation predominated. With respect to the social class variable, subjects tended to imitate those models whose social class corresponded to the subject's aspired social class.

Hicks (ref 34) has recently reported some data on the relative effectiveness of peer and adult models. Children were asked to view either male or female adult, or male or female peer aggressive models presented on film. Following exposure to the films, subjects were tested for imitative aggression; 6 months later a retest was given. For the first test session, subjects who viewed peer-male models imitated at a significantly higher rate than those who viewed either the adult-male or peer-female models. For the retest session, however, the adult-male, model group had a significantly higher performance level. Hicks concluded that the male-peer model has the most immediate effect, but the adult male model the most lasting.

INDIVIDUAL DIFFERENCES

Bandura, Ross, and Ross (refs 25, 26) found that boys generally exhibited more physical imitative aggression than girls. This difference the authors attributed to the sex-typing of the behavior; boys are expected to be more physically aggressive than girls. The fact that female subjects imitated female models and male subjects male models after verbal aggressive (less clearly sex-linked) models were provided, supports this interpretation.

Henker (ref 18), using a need-for-approval questionnaire, among other indices of personality, found personality not to be related to the elicitation of imitative behavior. Children of ages 6-10 served as subjects. McDavid (ref 35) using children ranging in age from 4 to 6, reported results indicating that there is also no relationship between intelligence and imitative responses.

McDavid also observed that 6-year-old female and 4-year-old male subjects imitated significantly more often than 4-year-old female and 6-year-old male subjects. He also found that first-born children imitate to a significantly greater extent than subsequent children. Schwartz (ref 36) used older subjects varying in age from 9 to 16 years. More imitation occurred in 9- and 10-year-old children than in those 15- and 16-years old.

SUMMARY

The available research on imitation with children indicates that reinforcement, whether of a primary or social nature, facilitates imitation. Whether reinforcement leads to the performance or the learning of imitation remains to be resolved. Both vicarious and secondary reinforcement have also been shown to facilitate imitation. Imitation tends to generalize over similar situations and over responses. Incidental cues facilitate imitation, but can have an interfering effect if ambiguity exists with respect to their association with model behavior. Males tend to be more effective models. However, when a choice is to be made between parents, the like-sex parent is more frequently imitated. Personality and intelligence tend to be unrelated to imitation. The effect of age as a variable is unclear.

SECTION IV

RESEARCH WITH ADULTS

VARIABLES

Some of the variables studied with children have also been investigated in adult-subject studies. Several studies have been done with the reinforcement variable. Generalization has been the subject of some consideration. Also, a number of experiments reporting on the effect of individual differences have been published. The variables of social sanction, model competence, and set have appeared for the most part only in adult-subject studies, however. Each of these variables will be discussed below.

REINFORCEMENT

Schein (ref 37) conducted a study to determine whether the Miller-Dollard "matched-dependent" paradigm would also be operational for adult imitation. He reported that a significant number of subjects learned to imitate when reinforcement was provided. These results are in agreement, therefore, with those obtained by Miller and Dollard. Karnaeff and Lanzetta (refs 38 43 44) varied the probability of reinforcement (80%, 50%, or 20%) and found that imitation increased as the probability of reward increased. Similarly, O'Connel (ref 39) obtained significantly higher imitative response rates under high reinforcement conditions than under low reinforcement conditions. The studies by Lanzetta and Kanareff (ref 40), Spreen (ref 41), and Rosenbaum, Horne and Chalmers (ref 42) lend additional support to the above findings.

Kanareff and Lanzetta (ref 43) designed a study in which they compared the effect of social and task reinforcement in a two-choice probability situation. Social reinforcement consisted of cues ("okay" and "good") given by the experimenter. Task reinforcement was provided by an indication of the correctness of the response. The results revealed that the social reinforcer was less effective in eliciting imitative behavior. In a related study (Lanzetta and Kanareff, ref 44), the social reinforcer was again found to be inferior.

SOCIAL SANCTION

Social sanction has been studied as a negative reinforcer of imitative behavior. In an experiment on the effect of reward on adult imitative behavior, Schein (ref 37) noted some inconsistencies in the results he obtained, instances of low rates of imitation in adults. He wondered whether some motives operating in subjects could have been responsible for the inhibition of imitative behavior. Subjects may have interpreted imitative behavior as being similar to cheating, and therefore deserving of social disapproval. On the other hand, subjects may have had a genuine desire to solve the problems on their own, viewing the task as a challenge.

Schein's explanation that adults associate guilt and fear of social disfavor with imitation has stimulated some research interest. Kanareff and Lanzetta (ref 38) set out to test his explanation. One set of instructions to a group of subjects was designed to induce the expectation of negative sanctions for imitating; another was designed to induce the expectation of positive sanctions for imitating. As predicted, the rate and level of acquisition of imitation was significantly lower under negative than under positive sanctions. This occurred under all probability of reinforcement conditions.

In another study, Lanzetta and Kanareff (ref 45) attempted to surmount

the effect of instruction-induced negative sanction by increasing the instrumental value (reward) for the elicitation of imitative behavior. Monetary reward was offered for imitating under negative sanctions. The results showed that the effect of negative sanctions can be overcome by increasing the pay-off value.

Kanareff and Lanzetta (ref 45), in still another study, sought to determine whether negative sanction would differentially affect imitation in test-like situations and in less-achievement-oriented situations. The tasks selected for comparison were a problem-solving task and a guessing or gambling task. Imitation was expected to be more socially acceptable in the gambling task because chance rather than ability dictated the outcomes; less of a stigma of cheating was expected to be associated with the gambling situation. A significant difference between these situations was not obtained, however.

GENERALIZATION

Schein (ref 37) also investigated the generalization of imitative behavior. Three tests of generalization were given varying in the degree of similarity to the original test situation. Most generalization occurred in the most similar test situation, some generalization occurred in the intermediately similar test situation, and no generalization occurred in the least similar situation. These results confirmed those obtained by Miller and Dollard who used children as subjects.

COMPETENCE OF THE MODEL

A number of studies have indicated that the greater the model's competence, the greater the facilitation of the imitative learning process. In a study by Rosenbaum, and Tucker (ref 47), college students were asked to predict the outcomes of a series of fictitious horse races, after being exposed to the prediction and correctness of the prediction of a simulated partner. In the three conditions varying the competence of the model, the partner was correct either 80%, 50% or 20% of the time. They found, the higher the model's competence, the greater the imitation rate. Experiments by Mausner (ref 48), Rosenbaum, Chalmers, and Horne (ref 49), and Chalmers, Horne and Rosenbaum (ref 50) corroborate the above finding.

INDIVIDUAL DIFFERENCES

Subject competence, the counterpart of model competence, has also received some attention. Kanareff and Lanzetta (ref 51) exposed subjects to a predesignated success and failure experience and found that the failure experience led to more imitation than the success experience did. Rosenbaum, Chalmers, and Horne (ref 49) also demonstrated that prior failure leads to the

facilitation of imitative responses. Chalmers, Horne, and Rosenbaum (ref 50) found subjects imitated a model more consistently if they had had disagreement experiences with the model. Disagreement was interpreted to function much like a failure experience.

Another pair of studies have dealt with the relatedness of self-esteem to imitation. DeCharms and Rosenbaum (ref 52) obtained more imitative responses from subjects who were low in measured self-esteem than from subjects high in self-esteem. Rosenbaum, Horne, and Chalmers (ref 53), however, found this relational tendency to hold only under a high probability of reinforcement. Imitation does not appear to be unalterably related to levels of self-esteem, the authors point out; environmental contingencies can, apparently, modify this relationship.

SET

The phenomenon of set has been extensively demonstrated by Luchins (ref 54) in various problem-solving situations. He has shown that subjects who learned to solve a series of problems using a particular method have found difficulty with subsequent problems solvable by a different but easier method. Control group subjects who were not asked to solve the initial series of problems, solved more of the subsequent problems in the time allotted. Luchins interprets these results to indicate that experience in the solution of problems using one method tends to interfere with the solution of problems requiring another method. There appears to be an inherent tendency to attempt to apply the same method to subsequent problems.

With respect to imitative behavior, Luchins cites evidence indicating that problem-solving skills acquired through imitation exhibit the same set-like characteristics. In one of a series of experiments, college students were asked to solve two-choice maze problems. Under one condition, subjects were required to solve problems either by imitation or by using the principle underlying the method of solution. Under a third condition, problems were not solvable by imitation but required the discovery of the principle underlying the solution of the problem. Luchins and Luchins (ref 55) found that subjects solved the problems with decreasing difficulty in the order of the conditions cited above. Also, experience with imitation problems led to the poorest performance on subsequent problems. Similar deleterious effects were reported in other studies by Luchins and Luchins (refs 57, 58).

In one of the studies cited above, Luchins and Luchins (ref 57) raise some important theoretical questions which have considerable bearing on future research in the area and specifically on research planned to test the effectiveness of modeling as a cross-cultural training technique:

Aside from the problem of Einstellung (set), there is the problem of what is learned when one uses a social influence as a cue for correct responses. Does one

merely learn to repeat the model or does one learn through the model, and what are the conditions under which one or the other kind of learning occurs? This question is not only of theoretical importance but also has important practical implications. It is closely related to the issue of what is learned when one learns to play a certain (social) role and hence has implications for sociology, psychopathology, and for psychotherapeutic techniques based on role-playing concepts. It is not enough to ask whether or not an individual learned a given role, one should also be concerned with what the individual learned when he learned the role. Did he learn to repeat another's behavior blindly; did he become habituated, mechanized, or blinded through imitation? Or did he learn, through the social model, to solve certain problems, to deal with certain social situations, to react to the requirement of certain situations? Learning of a particular role, if one becomes mechanized in the process, may hinder solution of subsequent similar-appearing social situations (p. 66).

SUMMARY

The variables investigated with adult subjects provide some clues as to the nature of the development of imitative processes. Evidence indicates that social sanction and model competence are important factors controlling the elicitation of adult imitative behavior. The adult comes to realize that imitative behavior does not always bring social acceptance and finds that model competence is a prerequisite if imitation is to be a profitable form of activity. To the child, on the other hand, these factors tend not to play a determining role as the competence of the parents is assumed and disapproval of imitation is unlikely to occur. Only as an adult does the individual need to make such discriminations.

The review studies using adult subjects indicates:

1. Both social and task reinforcement facilitate the elicitation of imitative behavior. There is some evidence, however, that a task reinforcer is the more effective of the two.
2. Social sanctions have a controlling effect upon the elicitation of imitative behavior.
3. Imitation tends to generalize to similar situations.
4. The more competent the model the more likely it is that imitative behavior will be elicited.
5. Prior failure experiences and low self-esteem tend to be associated with greater imitation rates.

6. Skills in problem-solving acquired through imitation tend to be applied in a set-like fashion.
7. The question of what is learned when one learns through imitation is a question of major theoretical and practical importance and remains to be answered.

SECTION V

MODELING AS A TRAINING TECHNIQUE

In the training techniques that have been used to date, the model has been presented in one of two ways. In some, the model has appeared in person; in others, via playback of a recording. Audiotape, sound film, and closed-circuit television have been used to good advantage in reproducing model performance in that they have provided uniformity of presentation and have saved instructor time.

The role of modeling in the areas of education, industry, and in the Armed Forces is reviewed in this section.

EDUCATION

The classroom teacher frequently relies upon modeling as a method of instruction. For children of the primary grades for example, he models on the board the writing of the alphabet, later the writing of words, and finally the construction of sentences. For the more sophisticated high school or college student, he demonstrates the problem-solving procedures that need to be followed in algebra and calculus. In other situations, he models the operation of such equipment as the microscope, lathe, and the use of the parallel bars. Modeling is likely to be most effectively used on occasions when the student is faced with a novel situation. From the examples cited, one might conclude that motor skills are the predominant subject of modeling and imitation.

Verbal models are, however, also being utilized in the field of education. The most outstanding example is found in the language laboratory. In the standard laboratory, the language student is provided with audiotape-recorded material, usually of a conversational nature. He listens to a segment of a recording and then is given the opportunity to copy or reproduce the preceding conversational segment. In most systems, space is also available for the student's responses to be recorded. Therefore, not only has he the opportunity to benefit from imitating a model, but also from the feedback he receives as he compares his performance with that of the model.

The language laboratory has found wide acceptance, yet little research is available concerning its effectiveness in comparison with the normal instructional procedures. Of the studies which have been conducted, Carroll (ref 59) finds that most are poorly controlled and, therefore, of limited usefulness.

The study by Pickrel, Neidt and Gibson (ref 60) is among those which are the exception to the rule. Language laboratory procedures were compared to normal instructional methods. One group of subjects (control) was taught by a teacher who was trained in Spanish. Four other groups (experimental) were taught by teachers without training in Spanish using tapes as an instructional aid. While the results obtained from a written test indicated that the control group was superior, no significant differences were obtained between subjects randomly selected from the control and experimental classes, on a test of oral fluency as rated by a panel of experts. Pickrel et al, concluded that tape recordings serve as an effective means of teaching conversational Spanish to seventh-grade students. The results were considered too limited, however, to justify the conclusion that an untrained teacher using tapes as an adjunct can replace a trained teacher.

A group of researchers at Antioch College (ref 61) have also reported well-controlled studies. The purpose of the investigations was to compare the effectiveness of two methods of language instruction. One group of 20 students received regular instruction, meeting six times a week with an instructor. A second group of 60 students received regular instruction twice a week and met with laboratory assistants four times a week for 90 minute periods: (a) during the first 30 minutes, transparencies were presented along with a tape-recording, (b) during the second 30 minutes, students worked individually in standard language booths, (c) during the final 30 minutes, subjects practiced and had the opportunity to interact with a student assistant. In both 1-year studies, the differences in language proficiency between the control and experimental groups were not significant, and the investigators reported that the experimental group subjects tended to like their training procedure better. They also pointed out that use of the experimental procedure saved 12 hours per week of instructor time without an apparent loss of language proficiency. Also, more supervised learning time was made available to the student.

Carroll et al (ref 62) obtained similar results when a group of subjects who had the benefit of a language laboratory was compared with one that did not. In terms of auditory comprehension skills, a nonsignificant difference was found. On tests of reading, vocabulary, and grammar, the language laboratory group did poorer, however.

The results of these studies suggest that the language laboratory is

at least as effective in producing oral fluency and comprehension as regular instruction. Reading and writing skills, on the other hand, are not as readily acquired in the laboratory as they are in the classroom.

INDUSTRY

A training method that has received considerable development recently is role-playing³. It was originally designed to be used in therapeutic situations, but since has been adapted for use in supervisory, sales, and management training programs in industry. A group of trainees is typically confronted with a problem or case presented either by a live dramatization, or on film. Next, each member is asked to assume a specific role in the enactment of the human relations incident in question; the role may be that of a laborer, foreman, or salesman. Other members of the training group watch. A group discussion of the individual role performances follows to complete the training session.

Not only is there an element of modeling involved in this technique, but an element of feedback also, provided by members of the training class. It is likely that both elements contribute to the effectiveness of the training technique. However, no evidence is available which indicates what contribution each makes.

Belbin, Belbin, and Hill (ref 65) reported some research on three different methods of manual skill training. The task was mending new woollen fabrics. One group was trained by the traditional demonstration method, the trainee receiving instruction from a skilled worker. For another group the task was subdivided and subjects were asked to learn it in steps. A third group was trained by a method in which workers of low mending skill emphasized critical perceptual cues. The training method used for the third group was based on the theory that correct perception of cues determines the successful execution of the task. Also, unskilled models were used for the reason that they are more likely to remember important cues than skilled models. The authors considered this method to be an improvement over modeling methods as the latter only present a visual picture of what is required and do not provide assistance in how to acquire it. The results that were obtained revealed only slight differences in the quality of work among the groups. The third group required less time, however.

Several studies have been conducted to assess the effectiveness of films and television as training techniques. When compared with the traditional

³ For a more complete discussion of role-playing see Maier, Solem and Maier (ref 63) and Corsini and Shaw (ref 64).

methods (lectures, reading materials, live demonstrations etc.), they have been found to be in most cases, at least as effective. The VanderMeer (ref 66) study is an example of comparing these methods. Subjects were asked to learn to operate a lathe under various training methods including film demonstration. VanderMeer concluded that trainees receiving instruction through well-produced films require, on the average, less time to complete a task on a lathe without sacrificing accuracy.

ARMED SERVICES

The Armed Services also have found films and television to be useful training devices. The training needs of the services are obviously quite extensive; large numbers of men must be trained with a maximum of efficiency in a limited amount of time. Individual instruction when desirable cannot always be provided. Consequently, audio-visual techniques have often served as effective substitutes.

Many of the films that have been used contain modeling procedures. The following is a review of the research that has been done with such films.

McCoy (ref 67) conducted some research on film production techniques, studying such variables as the size of the shot, the camera angle, and the set. The film that he used serves as an example of modeling techniques being employed by the Armed Services; it demonstrated the operation of the M-1 rifle. The following are some of the aspects of marksmanship that were covered: (1) how to sight and aim the M-1 rifle, and (2) how to make and use the hasty and loop slings, and (3) the proper execution of prone and kneeling firing positions.

In a study by Roshal (ref 68), a perceptual-motor task (tying knots with a rope) was modeled on film. The study was designed to test the effectiveness of a pair of variables in motion-picture presentation. The camera angle was investigated; one film was taken facing the model and another looking over the shoulder. Another variable was the depiction of motion as opposed to static shots at progressive stages of completion. All of a large number of naval trainees were asked to tie the bow-line, sheet bend, and spanish bowline knots irrespective of the treatment group they were in. Roshal learned that films taken over the shoulder resulted in better performance. Therefore, the more learner-oriented modeling appears to be better. Also, films which depicted motion proved to be more effective.

Murnin, Hayes and Harby (ref 69) demonstrated that complex motor skills such as tumbling can be taught effectively using films. In a subsequent study, Harby (ref 70) found that motion picture demonstrations of tumbling skills were as effective as those of a live instructor. He also reported evidence that a method involving demonstrations interspersed with practice tends to be superior to massed demonstrations, and that coaching

makes an additional significant contribution. Michael and Maccoby (ref 71) obtained similar results. Subjects who practiced verbal material between segments of film performed considerably better than subjects who simply viewed the film. Another, and most significant finding was that providing knowledge of results after practice influenced the amount learned.

More extensive work on the effectiveness of practice interspersed within film demonstrations has been done by F. D. Sheffield and his associates. As discussed in a preceding section, Sheffield (ref 11) formulated the theory that perceptual and symbolic responses are learned from demonstrations that are later converted into overt responses by the learner. When demonstrations are simple and of short duration, no unusual problem arises with respect to the performance of the to-be-learned task. However, if the material to be learned is lengthy and complex, conflicting responses (intraserial interference) are likely to occur, retarding acquisition of the demonstrated task. When this occurs, practice interspersed within a lengthy film demonstration may serve as an advantageous methodological alternative.

However, the effectiveness of the interspersal of practice is a function of the manner in which the film sequence is interrupted. At one extreme, if practice is permitted only after the presentation of the entire film sequence, intraserial interference is likely to occur. At the other extreme, if practice is introduced following minute segments of demonstration, the subject may find difficulty integrating the entire task. Sheffield has reported some research which deals with this problem.

The purpose of the pair of studies by Maccoby and Sheffield (ref 72) was to determine the optimum combination of demonstration and practice. In one experiment, groups of male college students were asked to learn how to assemble the 30 parts of an automobile distributor from a film demonstration presented three times. The groups differed with respect to the length of the segment viewed before practice periods. Subjects in one group practiced following one demonstration-assimilation (D-A) span; a D-A span was defined as the amount of material 75% of a group of subjects can retain to perform immediately without error. For a second group (whole method) practice followed after two D-A span segments. A third group did not practice until the film was shown in its entirety. Subjects in a fourth group (transition method) practiced after one D-A span on the first trial, two D-A spans on the second trial. All groups were given a test trial in which the subjects were required to assemble the entire distributor without interruption. Both error and latency measures were obtained for all trials. The results for both practice and test trials indicated that the one D-A segment and transition groups did best; the two D-A segment group was next followed by the whole practice group which did poorest of all. However, one D-A segment group performance level for the test trial dropped below that of the third trial. Also, it was slightly below the test trial performance level of the transition group. In a second experiment, similar in design to that of the first, high school

students were asked to learn the steps of a geometric construction problem presented on film. Under one condition, one group of classes practiced following one D-A span; a second group practiced after two D-A spans, and a third after three D-A spans. Finally, a fourth group (whole method) practiced only after the entire presentation of the film. The film was presented twice; a test trial followed. The results from the practice trials supported those obtained in the first study. The results from the practice trials differed, however; the performance level of the one D-A procedure dropped from best to poorest, and the three D-A, two D-A and whole method were superior in the order cited.

The authors suggested that the reduction of the one D-A group test trial performance resulted because the procedure did not facilitate task integration. This interpretation is supported by the fact that larger-segment groups performed better. On the other hand, in the first experiment the performance level of the one D-A group was superior to all groups except for the transition group, despite the fact that test trial performance dropped below that of the third trial. This disparity, the authors suggested, can be interpreted in terms of the notion of "natural units" of a task; "natural units" (one or two D-A segments, for example) or subassemblies have a certain amount of unity or independence themselves. Consequently, one may assume, less interference will occur if the task is learned in terms of integrated segments than if it is learned in terms of nonintegrated subassemblies. Since the automobile distributor lends itself, apparently, to being assembled in terms of "natural units" and the geometric construction task does not, this difference in task characteristics may account for the superior performance displayed by one D-A group in the first study.

A study by Margolius, Sheffield and Maccoby (ref 73) was designed to test the natural units hypothesis. Subjects were asked to learn to assemble the 64 parts of a Waste Gate Motor via two film demonstrations. One group of subjects (synchronous) practiced following the presentation of natural units; a second group (asynchronous) practiced at points which interrupted both practice and test trials. Therefore, the results do not favor the natural units hypothesis. In another study by Margolius, Sheffield and Maccoby (ref 74), one group (repetition) was given training repetitively (two trials) on one natural unit before the next unit was practiced; and subjects in a second group (consecutive) practiced all natural units once before returning for a second trial. The film demonstrated the assembly of an automobile distributor. The results from this study do support the natural units hypothesis, because the repetitive group displayed superior performance rates for the practice trials and the test trial. A third study by Margolius, Sheffield, and Maccoby (ref 75) was a replication of the second, except that the Waste Gate Motor was used as a task. The results revealed that the

repetitive method was superior only during the second practice trial, this superiority being lost during the test trial. Since the studies involving the Waste Gate Motor produced negative results and the study involving the automobile distributor yielded positive results, it is possible that the results are a function of the tasks employed. Additional research is needed to resolve this issue.

Maccoby and Sheffield (ref 72) concluded that a training technique similar to the transition method should prove to be the best as it combines the advantages of learning natural units and those of learning a task as a whole. They stated, "The optimum use of practice involves transition from smaller to larger segments of the task, the aim being to maximize transfer from training conditions to the conditions of actual performance" (p. 16).

SECTION VI

IMPLICATIONS FOR RESEARCH IN CROSS-CULTURAL TRAINING

An evaluation of the literature on modeling and imitation indicates that the laboratory exploration of such techniques in training for cross-cultural interaction is potentially fruitful. In illustration of this judgement, consider the following interpretation of the generalized cross-cultural interaction sequence.

The behavior of a person in a dyadic or group interaction with a person or persons of another culture can be conceptualized in the following. The interaction sequence consists of one person emitting some cue (statement, gesture, voice inflection, etc.) which then acts as a stimulus for the response of another party in the interaction, which in turn acts as a reciprocal cue for a new response from the first individual, or from a third person. The job of each person in the situation is threefold. First, he must perceive the indicator cue⁴ from the other-culture individual; second, he must make a mental connection or pairing of this cue with the appropriate or desirable response; finally, he must perform the desired response. Within any culture or subculture there are established accepted, normative pairings of cues and responses, and complex interdependent systems of cues and responses. Much of the difficulty of communication in a cross-cultural context can be traced to a disparity of cue-response systems between cultures. For instance, in the American culture, cue A_1 may require response B_1 ; while in Culture "X" the same cue, A_1 , requires response B_2 ; and in Culture Y, cue A_1 , is nonexistent or nonsignificant and randomly emitted, requiring no specific response. The

⁴This cue may be environmental or contextual in nature as well as behavioral.

implication of conflicting cue-response systems on the probability of successful interpersonal cross-cultural interaction is evident. Misreading of cues leads to maladaptive responses that, in turn, can quickly destroy necessary rapport, which had been painstakingly developed.

Conceiving the cross-cultural interaction situation in this manner, the implication of modeling techniques through videotape presentation for training becomes clear. A trainee, viewing a simulated interaction sequence between an American and a person of another culture, is able to study and scrutinize, from a relatively objective third-person viewpoint, the three components of the interaction described above. That is, he can view the cues given by the other culture individual, he can note the appropriate cue-response linkages, and observe the response of the American and the consequences of that response. Comparing an optimal or criterion performance with an ineffective performance can give the trainee a basis for evaluating his own behavior in similar circumstances. Finally, the subject, aided by supplementary instruction, can use film or videotape clips of a model interaction to see more clearly the differences in values, assumptions, and normative modes of behavior between the two cultures that underlie the cue-response system disparities.

Nowhere in the course of reviewing the literature on imitation and modeling was there an indication that a modeling technique has ever been applied as an aid in acquiring cross-cultural interaction skills. A need exists, therefore, to evaluate the effectiveness of such techniques for training. To this end, the program of laboratory and field experimentation underway at Aerospace Medical Research Laboratories will be expanded to include studies that will explore the utility of modeling techniques, in conjunction with role-playing by the trainee. This research will manipulate various factors such as type of simultaneous supplementary training, nature of model performance (optimal vs. bad), and degree of structuredness and similarity of model role-play and trainee role-play. It will also compare the efficacy of model viewing and self-confrontation as training techniques.

REFERENCES

1. Haines, D. B., Training for Culture Contact and Interaction Skills, AMRL-TR-64-109 (AD 611 022), Aerospace Medical Research Laboratories, Wright-Patterson Air Force Base, Ohio, December 1964.
2. Eachus, H. T., Self-Confrontation for Complex Skill Training: Review and Analysis, AMRL-TR-65-118 (AD 624 062), Aerospace Medical Research Laboratories, Wright-Patterson Air Force Base, Ohio, September 1965.
3. Haines, D. B. and Eachus, H. T., A Preliminary Study of Acquiring Cross-Cultural Interaction Skills through Self-Confrontation, AMRL-TR-65-137 (AD 624 120), Aerospace Medical Research Laboratories, Wright-Patterson Air Force Base, Ohio, September 1965.
4. Eachus, H. T. and King, P. H., Acquisition and Retention of Cross-Cultural Interaction Skills through Self-Confrontation, AMRL-TR-66-8, Aerospace Medical Research Laboratories, Wright-Patterson Air Force Base, Ohio, May 1966.
5. Bandura, A. and Walters, R. H., Social Learning and Personality Development, Holt, Rinehart and Winston, New York, 1963.
6. Winch, R. F., Identification and its Familial Determinants, Bobbs-Merrill, Indianapolis, 1962.
7. Symonds, P. M., The Dynamics of Human Adjustment, Appleton-Century-Crafts, New York, 1946.
8. Secord, P. F. and Backman, C. W., Social Psychology, McGraw-Hill, New York, 1964.
9. Miller, N. E. and Dollard, J., Social Learning and Imitation, Yale University Press, New Haven, 1941.
10. Asch, S. E., Social Psychology, Prentice-Hall, New York, 1952.
11. Sheffield, F. D., "Theoretical Considerations in the Learning of Complex Sequential Tasks from Demonstration and Practice," in Lumsdaine, A. A. (Ed.), Student Response in Programmed Instruction: A Symposium, National Academy of Sciences - National Research Council, Washington, D. C., 1961.

12. Mowrer, O. H., Learning Theory and the Symbolic Processes, John Wiley & Sons, New York, 1960.
13. Sears, R. R., "Identification as a Form of Behavioral Development," in Harris, D. B. (Ed.), The Concept of Development, University of Minnesota Press, Minneapolis, 1957.
14. Whiting, J. M., "Resource Mediation and Learning by Identification," in Iscoe, I. and Stevenson, H. W. (Eds.), Personality Development in Children, University of Texas Press, Austin, Texas, 1960.
15. Stotland, E., "Identification with Persons and Groups," final report on Grant M-2423 to National Institute of Mental Health, U. S. Public Health Service, 1961. Cited in Secord, P. F. and Backman, C. W., Social Psychology, McGraw-Hill, New York, 1964.
16. Maccoby, E. E., "Role-taking in Childhood and its Consequences for Social Learning," Child Development, 30: 239-252, 1959.
17. Baer, D. M. and Sherman, J. A., "Reinforcement Control of Generalized Imitation in Young Children," J. Exp. Child Psychology, pp 37-49, 1964.
18. Henker, B. A., "The Effect of Adult Model Relationships in Children's Play and Task Imitation," Dissert. Abs., 24: 4797, 1964.
19. Stein, A. H. and Wright, J. C., "Imitative Learning under Conditions of Nurturance and Nurturance Withdrawal," Child Development, 35: 927-938, 1964.
20. Bandura, A. and Huston, A. C., "Identification as a Process of Incidental Learning," J. Abnorm. Soc. Psychol., 63: 311-318, 1961.
21. Bandura, A., Ross, D., and Ross, S. A., "A Comparative Test of the Status Envy, Social Power, and Secondary Reinforcement Theories of Identificatory Learning," J. Abnorm. Soc. Psychol., 67: 527-534, 1963.
22. Bandura, A., "Social Learning Through Imitation," Nebraska Symposium on Motivation, University of Nebraska Press, Lincoln, Nebraska, 1962.
23. Bandura, A. and Kupers, C. J., "Transmission of Self-Reinforcement through Modeling," J. Abnorm. Soc. Psychol., 69: 1-9, 1964.
24. Bandura, A., "Influence of Model's Reinforcement Contingencies on the Acquisition of Imitative Responses," J. Pers. Soc. Psychol., 1: 589-595, 1965.

25. Bandura, A., Ross, D., and Ross, S. A., "Transmission of Aggression through Imitation of Aggressive Models," J. Abnorm. Soc. Psychol., 63: 575-582, 1961.
26. Bandura, A., Ross, D., and Ross, S. A., "Imitation of Film-Mediated Aggressive Models," J. Abnorm. Soc. Psychol., 66: 3-11, 1963.
27. Hartup, W. W., "Patterns of Imitative Behavior in Young Children," Child Development, 35: 183-191, 1964.
28. Wilson, W. C., "Imitation and the Learning of Incidental Cues by Preschool Children," Child Development, 29: 393-397, 1958.
29. McDavid, J. W., "Effects of Ambiguity of Environmental Cues Upon Learning to Imitate," J. Abnorm. Soc. Psychol., 65: 381-386, 1962.
30. McDavid, J. W., "Effects of Ambiguity of Imitative Cues Upon Learning by Observation," J. Soc. Psychol., 62: 165-174, 1964.
31. Rosenblith, J. F., "Learning by Imitation in Kindergarten Children," Child Development, 30: 69-80, 1959.
32. Hartup, W. W., "Some Correlates of Parental Imitation in Young Children," Child Development, 33: 85-96, 1962.
33. Maccoby, E. E. and Wilson, W. C., "Identification and Observational Learning from Films," J. Abnorm. Soc. Psychol., 55: 76-87, 1957.
34. Hicks, D. J., "Imitation and Retention of Film-Mediated Aggressive Peer and Adult Models," J. Pers. Soc. Psychol., 2: 97-100, 1965.
35. McDavid, J. W., "Imitative Behavior in Preschool Children," Psychol. Monogr., 73: 486, 1959.
36. Schwartz, N., "An Experimental Study of Imitation. The Effects of Rewards and Age," cited in Rosenblith, J. F., "Learning by Imitation in Kindergarten Children," Child Development, 30: 69-80, 1959.
37. Schein, E. H., "The Effect of Reward on Adult Imitative Behavior," J. Abnorm. Soc. Psychol., 49: 389-395, 1954.
38. Kanareff, V. T. and Lanzetta, J. T., "The Acquisition of Imitative and Opposition Responses under Two Conditions of Instruction-Induced Set", J. Exp. Psychol., 56: 516-528, 1958.
39. O'Connel, E. J., "The Effects of Probability of Reinforcement, Cooperative-Competitive Set, Sex of Model, and Sex of Subject in Imitative Behavior in a Two-Choice Situation," Diss. Abstr., 23: 4769, 1963.

40. Lanzetta, J. T. and Kanareff, V. T., Some Social Factors Affecting the Choice of an "Imitative" Response in a Probability Learning Situation, WADD-TR-60-196 (AD 249 042), Wright Air Development Division, Wright-Patterson Air Force Base, Ohio, 1960.
41. Spreen, G. W., "Elicitation of Imitative Responses in a Verbal Conditioning Experiment," Dissert. Abstr., 21: 2805, 1961.
42. Rosenbaum, M. E., Horne, W. C., and Chalmers, D. K., "Level of Self-Esteem and the Learning of Imitation and Nonimitation," J. of Personality, 30: 147-156, 1962.
43. Kanareff, V. T. and Lanzetta, J. T., "Effects of Congruent Social and Task Reinforcement upon Acquisition of Imitative Responses," Psych. Rep., 8: 47-57, 1961.
44. Lanzetta, J. T. and Kanareff, V. T., "The Effects of Congruent and Conflicting Social and Task Feedback on the Acquisition of an Imitative Response," J. Exp. Psychol., 62: 322-328, 1961.
45. Lanzetta, J. T. and Kanareff, V. T., "The Effects of a Monetary Reward on the Acquisition of an Imitative Response," J. Abnorm. Soc. Psychol., 59: 120-127, 1959.
46. Kanareff, V. T. and Lanzetta, J. T., "Effects of Task Definition and Probability of Reinforcement upon the Acquisition and Extinction of Imitative Responses," J. Exp. Psychol., 60: 340-348, 1960.
47. Rosenbaum, M. E. and Tucker, I. F., "The Competence of the Model and the Learning of Imitation and Nonimitation," J. Exp. Psychol., 63: 183-190, 1962.
48. Mausner, B., "The Effect of one Partner's Success in a Relevant Task on the Interaction of Observer Pairs," J. Abnorm. Soc. Psychol., 49: 557-560, 1954.
49. Rosenbaum, M. E., Chalmers, D. K., and Horne, W. C., "Effects of Success and Failure and the Competence of the Model on the Acquisition and of Matching Behavior," J. Psychol., 54: 251-258, 1962.
50. Chalmers, D. K., Horne, W. C., and Rosenbaum, M. E., "Social Agreement and the Learning of Matching Behavior," J. Abnorm. Soc. Psychol., 66: 556-561, 1963.
51. Kanareff, V. T. and Lanzetta, J. T., "Effects of Success-Failure Experiences and Probability of Reinforcement upon the Acquisition and Extinction of an Imitative Response," Psychol. Rep., 7: 151-166, 1960.

52. DeCharms, R. and Rosenbaum, M. E., "Status Variables and Matching Behavior," J. Personality, 28: 492-502, 1960.
53. Rosenbaum, M. E., Horne, W. C., and Chalmers, D. K., "Level of Self-Esteem and the Learning of Imitation and Nonimitation," J. Personality, 30: 147-156, 1962.
54. Luchins, A. S., "Mechanization in Problem Solving," Psychol. Monogr., 54, No. 248, 1942.
55. Luchins, A. S. and Luchins, E. H., "Imitation by Note and by Understanding," J. Soc. Psychol., 54: 175-197, 1961.
56. Luchins, A. S., "On Agreement with Another's Judgments," J. Abnorm. Soc. Psychol., 39: 97-111, 1944.
57. Luchins, A. S. and Luchins, E. H., "Einstellung Effect in Social Learning," J. Soc. Psychol., 55: 59-66, 1961.
58. Luchins, A. S. and Luchins, E. H., "The Effect of the Degree of Freedom of Choice on Learning and Perception," J. Soc. Psychol., 56: 187-205, 1962.
59. Carroll, J. B., "Research on Teaching Foreign Languages," in Gage, N. L. (Ed.), Handbook of Research on Teaching, Rand McNally, New York, 1963.
60. Pickrel, G., Neidt, C., and Gibson, R., "Tape Recordings are used to Teach Seventh Grade Students in Westside Junior-Senior High School, Omaha, Nebraska," Nat. Ass. Sec. Sch. Principals Bull., 42: 81-93, 1958.
61. Antioch College, Experiment in French Language Instruction: Second Report, 1959-1960, Yellow Springs, Ohio, 1960.
62. Carroll, J. B., et al, Annual Report, Committee on Foreign Languages, School and University Program for Research and Development, Period of July 1, 1958 - June 30, 1959, Harvard University, Graduate School of Education, Cambridge, Mass., 1959.
63. Maier, N. F., Solem, A. R., and Maier, A. A., Supervisory and Executive Development: A Manual for Role-Playing, Wiley, New York, 1957.
64. Corsini, R. J. and Shaw, M. E., Role-Playing in Business and Industry, Free Press of Glencoe, New York, 1961.

65. Belbin, E., Belbin, R. M., and Hill, F., "Comparison between the Results of Three Different Methods of Operator Training," Ergonomics, 1: 39-50, 1957.
66. VanderMeer, A. W., "The Economy of Time in Industrial Training: An Experimental Study of the Use of Sound Films in the Training of Engine Lathe Operators," J. Ed. Pscyh., 36: 65-90, 1945.
67. McCoy, E. P., An Application of Research Findings to Training Film Production, Pennsylvania State College, Pennsylvania State College Instructional Film Research Program, May 1955.
68. Roshal, S. M., Effects of Learner Representation in Film-Mediated Perceptual-Motor Learning, Pennsylvania State College, Pennsylvania State College Instructional Film Research Program, December 1949.
69. Murniu, J. A., Hayes, W., and Harby, S. F., Daylight Projection in Film Loops as the Teaching Medium in Perceptual-Motor Skill Training, Pennsylvania State College, Pennsylvania State College Instructional Film Research Program, 1952.
70. Harby, S. F., Evaluation of a Procedure for Using Daylight Projection of Film Loops in Teaching Skills, Pennsylvania State College, Pennsylvania State College Instructional Film Research Program, May 1962.
71. Michael, D. N. and Maccoby, N., "Factors Influencing Verbal Learning from Films under Varying Conditions of Audience Participation," J. Exp. Psychol., 46: 411-418, 1953.
72. Maccoby, N. and Sheffield, F. D., Theory and Experimental Research on the Teaching of Complex Sequential Procedures by Alternate Demonstration and Practice, Technical Memorandum ML-TM-57-31, Maintenance Laboratory, Air Force Personnel and Training Research Center, Lowry Air Force Base, Colorado, December 1957.
73. Margolius, G. J., Sheffield, F. D., and Maccoby, N., Timing of Demonstration and Overt Practice as a Function of Task Organization, Technical Memorandum ML-TM-57-13, Maintenance Laboratory, Air Force Personnel and Training Research Center, Lowry Air Force Base, Colorado, September 1957.
74. Margolius, G. J., Sheffield, F. D., and Maccoby, N., Repetitive Versus Continuous Demonstration and Practice in the Learning of a Serial Mechanical Assembly Task I, ML-TM-57-11, Maintenance Laboratory, Air Force Personnel and Training Research Center, Lowry Air Force Base, Colorado, September 1957.

75. Margolius, G. J., Sheffield, F. D., and Maccoby, N., Repetitive Versus Continuous Demonstration and Practice in the Learning of a Serial Mechanical Assembly Task II, Technical Memorandum ML-TM-57-12, Maintenance Laboratory, Air Force Personnel and Training Research Center, Lowry Air Force Base, Colorado, September, 1957.

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13. ABSTRACT

A study of the literature on imitation and modeling was conducted to aid in development of a modeling training technique to accelerate the acquisition of cross-cultural interaction skills. The modeling procedure is designed to provide exemplary behavior to the trainee via videotape recording. The literature review includes a summary of theoretical positions that have been formulated, a survey of research in terms of the variables that have been investigated, and a review of modeling techniques that have found application. A discussion devoted to implications for developing a cross-cultural training technique is also presented. The advantages and disadvantages of various procedures for constructing an effective modeling technique are examined. The literature reviewed indicated that a modeling training technique has to date not been used to aid in the acquisition of cross-cultural interaction skills. The report concludes with the recommendation that the effectiveness of such a training technique be evaluated.

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